

WHAT IS CLAIMED IS:

1. A superfinishing machine comprising:

a pair of driving rollers disposed in parallel to each other which rotate in the same direction to rotate a columnar work fed into the gap therebetween, and

a superfinishing grindstone which is pressed on the work being rotated by the driving rollers from above for superfinishing the periphery of the work with the superfinishing grindstone, wherein

the pair of driving rollers each have a plurality of axially continuous contact portions having different contours of axially taken section provided at opposing positions, and

the work is superfinished on the periphery thereof while being moved along the contact portions with the superfinishing grindstone pressed on the periphery of the work.

2. The superfinishing machine as defined in Claim 1, wherein the contour of axially taken section of the plurality of contact portions have different radii of curvature.

3. The superfinishing method performing the superfinishing of the periphery of the work by a superfinishing machine as defined in Claim 1.

4. The superfinishing method as defined in Claim 3, wherein

the work of which the peripheral generatrix is previously worked in a straight form is superfinished.

5. The superfinishing method as defined in Claim 3, wherein  
5 the work of which the peripheral generatrix is previously worked in a crown form is superfinished.

6. The columnar work having a periphery superfinished by a superfinishing method as defined in Claim 3.

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7. The rolling element having a rolling surface superfinished by a superfinishing method as defined in Claim 3.

15 8. A superfinishing method for superfinishing the periphery of a columnar work with a superfinishing grindstone pressed on the periphery of the work while rotating the work,

the superfinishing method comprising the steps of:

20 moving the work along tracks having different radii of curvature while being rotated, and

pressing the superfinishing grindstone on the work during the movement to form arcs having different radii of curvature on the periphery thereof.

25 9. The rolling element having a curve approximated by arcs

having different radii of curvature formed on the rolling surface thereof by a superfinishing method as defined in Claim 8, the curve having a continuous and gradual change over connections.

5 10. The rolling bearing comprising: a rolling element as defined in Claim 7 incorporated between an inner ring and an outer ring.

10 11. The rolling bearing comprising: a rolling element as defined in Claim 9 incorporated between an inner ring and an outer ring.